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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

Notes on the Introduction of

Deciduous Tamarisk¹Jerome S. Horton²

Several species of deciduous tamarisk were introduced into the United States during the last century. One of these species, Tamarix pentandra Pallas, has become aggressively naturalized and now occupies extensive areas of flood-plain lands (Robinson, 1958). Another species, Tamarix gallica L. has become naturalized in coastal lands along the Gulf of Mexico. A third species, Tamarix tetrandra Pallas, is still widely used as an ornamental shrub. Taxonomy of the deciduous species has been greatly confused in the past and is still subject to considerable research.

Nurserymen in the early 1800's were apparently the first to introduce tamarisk into the United States. In 1823, tamarisk was offered for sale in New York City by the Old American Nursery operated by Lawrence & Mills. Bartram's in Philadelphia was selling tamarisk by 1828. During the 1830's several nurseries along the eastern seaboard included tamarisk among their ornamental shrubs.

The National Agricultural Library (formerly U. S. Department of Agriculture Library) in Washington, D. C., has a Nursery

and Seed Trade Catalog Collection with price lists back to 1792. The following list, compiled from the early catalogs that have been preserved, includes those nurseries selling tamarisk before 1840, a period when the shrub seemed to be offered more widely as an ornamental.

1823 (November) -- Lawrence & Mills, "Treatise and catalog of fruit and ornamental trees, shrubs etc., cultivated at the Old American Nursery, Flushing-Landing, near New-York." On page 29 under "hardy shrubs, ornamental for their fruit or foliage" is listed "French tamarisk, an ornamental shrub" 37 1/2 cents.

¹The author is indebted to Dr. Elbert L. Little, Jr., Dendrologist, U. S. Forest Service, Washington, D. C., for his help in obtaining historical information.

²Research Forester, located at the Station's project headquarters at Tempe, in cooperation with Arizona State University; central headquarters is maintained at Fort Collins, in cooperation with Colorado State University.

1824--Stephen F. Mills & Company, "Catalog of Fruit and Ornamental Trees, shrubs, etc., cultivated at the Old American Nursery, Flushing-Landing, near New-York" lists on page 31, "French tamarisk, much admired".

1826--Stephen F. Mills & Company, "Catalogue of Fruit and Forest Trees, Flowering Shrubs and Plants, for sale by Stephen F. Mills & Company at Flushing-Landing, on Long-Island, near New-York", not only listed on page 39 "French tamarisk, much admired, (Tamarix gallica)", but also included German tamarisk (Tamarix germanica) for 37 cents.

1828--Bartram's Botanical Garden, Philadelphia, listed on page 28 both French "much admired" and German tamarisk for 37 cents.

1831--William Prince & Sons, Linnaean Botanical Garden and Nursery, Flushing, Long-Island, near New-York, listed on page 55 "French tamarisk, much admired (Tamarix gallica)" and German tamarisk (Tamarix germanica) for 37 to 50 cents.

1832-39--William Prince and Sons continued to list the two species of tamarisk in available catalogs of 1832, 1835, 1837, and 1839.

1832--William Kenrick's Nursery, Boston, on page 24 lists French and German tamarisk for 50 cents.

1832--Michael Floy, Harlam Nursery, New York. Both French and German are listed, and their beauty as ornamental shrubs thoroughly extolled.

1833--Brighton Nurseries, Boston, on page 17 offered French and German tamarisk for 50 cents.

1833-34--Nursery of William Kenrick in Newton, near Boston, listed on page 27 only French tamarisk (Tamarix gallica) for 50 cents.

1836-37--Sinclair Nursery in Baltimore on page 25 offered French tamarisk for 50 cents.

The earliest authentic records of tamarisk in the Southwest were also in nursery catalogs. Tamarisk was listed in 1856 by A. P. Smith in the catalog of the Pomological Garden and Nursery in Sacramento, California. In the same year, the Suscol Nursery, Suscol, California, listed African and German tamarisk.³

Tamarisk apparently was not naturalized to any extent in the Southwest by the 1850's because none of the U. S. Government explorers of that decade reported the genus. It is doubtful, therefore, whether the Spanish or Mexican occupation had brought tamarisk into the area. The statement of Standley (1923, p. 828) that tamarisk was "cultivated for ornament especially in the arid portions of northern Mexico, sometimes escaping" would indicate only local distribution in Mexico even as late as 1923.

Escalante reported "taray" growing at Fort Pierce Wash near the Utah-Arizona border in 1776 (Auerbach, 1943; Christensen, 1962). The Spanish word "taray" was translated to mean tamarisk, but Martinez (1937) states that, in Mexico, Salix, Eysenhardtia and Caesalpinia are often called "taray" but that tamarisk is not. Since Salix is common along the streams and washes of southern Utah, it is logical that Escalante could have been referring to Salix.

Later the U. S. Department of Agriculture began growing tamarisk and perhaps introduced some species into the United States. The 1868 Annual Report of the Department (U.S. Dept. Agr., 1869, p. 123) indicates that six species of tamarisk were established in the Department Arboretum. The 1870 report of the Commissioner of Agriculture (U. S. Dept. Agr., 1871) gives a map of the Arbore-

³Robinson, T. W. Introduction, spread, and areal extent of saltcedar (Tamarix) in western conterminous United States (In preparation for publication, U. S. Geological Survey, Menlo Park, Calif.)

tum Grounds showing several areas of planted tamarisk, which were not identified as to species.

From the early distribution of shrubs for ornamental plantings, tamarisk gradually began to escape from cultivation. Though naturalized tamarisk was collected on Galveston Island, Texas, in 1877 (table 1, T. gallica L.), this process took considerable time as indicated by comments in various flora. One of the earliest publications which refers to naturalized tamarisk (Gray, 1895-97, p. 280) states:

"T. gallica. A beautiful shrub frequent in cultivation and tending to escape in southern states; permanently established on James Island, near Charleston, South Carolina, C. E. Smith. Also naturalized in south and west Texas, Joor, Heller, etc. Flowers, spring and summer."

By 1903, T. gallica was common along roadsides and in waste places in the southern States (Small, 1903). In the west, references to naturalization are more localized. T. W. Robinson³ states that in 1898 tamarisk appeared along the Gila River near Gila Bend, Arizona. Kearney collected tamarisk along the Salt River near Tempe, Arizona, in 1901 (table 1) and remarked that it was common in river bottoms. Unfortunately, this specimen has no flowers but the foliage resembles T. pentandra.

Thornber (1916, p.1) states that, "No tamarisk are indigenous to the Western Hemisphere, though a few species have become naturalized in parts of our country, particularly in the Southern States." He indicates that tamarisk was growing successfully in Arizona as an ornamental 10 years previous to the publication. He highly recommends these shrubs for ornamental planting, especially in dry communities for windbreak, shade for poultry and small stock such as calves, sheep, and hogs, and even for fuel. In speaking of the seeds (p.3) he states: "These are easily carried by the wind and under favorable conditions the plant may be spread in this way."

Thus the widespread use of tamarisk in the West provided an excellent seed source for the rapid aggressive spread in the next several decades.

It is difficult to distinguish which species were utilized in the early plantings. This confusion was recognized by such early botanists as Thornber (1916) who states, for instance, that T. parviflora (now known as T. tetrandra) was often sold as T. gallica. He is the earliest authority to use the common name saltcedar synonymously with tamarisk.

Early herbarium specimens give some clues as to the species actually present in the United States. All tamarisk specimens in four herbaria have been examined; only three species of deciduous tamarisk were deposited prior to 1920. The four herbaria⁴ were: National Herbarium, U. S. National Museum, Smithsonian Institution (US); Pomona College (POM); University of Arizona (ARIZ); and Colorado State University (CS). Many of these specimens were incorrectly labeled due to the confusion in taxonomy.

Identification of the specimens has been tentatively changed by the author (table 1) following the species separation used by McClintock (1951) and revised by Horton (1957): the herbarium labels, without change, are shown in table 1. All specimens with 4-merous flowers are listed under Tamarix tetrandra. The 5-merous specimens are divided into T. pentandra, and T. gallica.

T. pentandra has a lobed disk with the filaments inserted below and at the notches of the disk. The petals are persistent and the anthers usually obtuse. Showy flowers occur on the old wood in the spring, and on much-branched panicles developed on new wood from late spring throughout the summer. A more complete description of this species as growing in Arizona is included in Horton and Flood (1962).

⁴ Herbarium abbreviations are according to Lanjouw and Stafleu (1959).

Table 1. --Herbarium specimens of tamarisk species collected prior to 1920, grouped to follow species separation used by McClintock (1951) and revised by Horton (1957). Information copied from labels in the herbaria¹

Date	Collector and number	Collector's identification	Locality	Notes	Herbarium number
<u>TAMARIX TETRANDBRA PALLAS</u>					
	1871 Dr. Parry	<i>T. parviflora</i>	Ag. Grounds ²	--	US 10922
	1871 Dr. Parry	<i>T. africana</i>	Ag. Grounds ²	--	US 10924
	1876 Vasey	<i>T. africana</i>	Agricultural Grounds ²	--	US 10925
May 11,	1879 Lester F. Ward	<i>T. gallica</i>	Ct. Ave.	Garden	US 132449
	1880 Vasey	<i>T. tetrandra</i> Pall.	Ag. Grounds ²	Cult., nearest the walk	US 10923
Apr 14,	1880 Marcus E. Jones	<i>Tamarix</i>	St. George, Utah	Cultivated	POM 86858
	1885 A. L. Schott	<i>T. africana</i>	District of Columbia	--	US 226861
May 13,	1885 A. L. Schott	<i>T. germanica</i>	Washington, D. C.	--	US 248005
May 1,	1886 A. L. S.	<i>T. germanica</i>	U. S. Bot. Garden, D.C.	--	US 132450
May 3,	1886 A. L. S.	<i>Tamarix</i>	Bot. Garden, D. C.	--	US 132461
	1888 Mrs. M. L. Nash	<i>T. gallica</i> L.	Texas	--	US 10895
May 5,	1891 Geo. B. Sudworth	<i>T. gallica</i>	Agricultural Grounds, Washington, D. C.	Herb. of Forestry Div.	US 478350
May 15,	1892 J. W. Toumey 101	<i>T. gallica</i>	Catalina Mts., Ariz.	--	US 212500
Mar 30,	1894 Marcus E. Jones 5002a	<i>T. gallica</i>	Harrisburg, Utah	2800 ft.	US 72090
Apr 5,	1894 Marcus E. Jones 5014	<i>T. gallica</i>	Beaverdam, Ariz.	1800 ft. Same sheet as above	
May 5,	1894 Marcus E. Jones 5014	<i>T. gallica</i>	Silver Reef, Utah	Gravel, Alt. 4500 ft.	POM 86855
May 16,	1895 Charles L. Pollard 210	<i>T. gallica</i>	Washington, D. C. Grounds. U. S. Dept. Agric.	--	US 237533
May 3,	1896 Juliet King	<i>T. gallica</i> L.	Ia. Circle, Wash., D. C.	From coll. of Forestry Div. USDA	US 479379
Apr 29,	1897 Biltmore Herbarium 5711	<i>T. parviflora</i> DC	From plants in cultivation at Biltmore, North Carolina	--	US 331807
Apr	1898 Mrs. J. M. Milligan	<i>T. gallica</i> L.	Bonham, Texas	--	US 504286
Apr 11,	1899 W. F. Wight	<i>T. gallica</i>	Stanford Arboretum, Santa Clara Co., Calif.	Cultivated	US 467791
	1911 Elmer Stearns 133	<i>T. gallica</i>	El Paso, Texas	Cultivated	US 502875
Apr 11,	1917 I. Johnston	<i>T. gallica</i>	Wilmington, Calif.	Scraggly shrub, sand dunes	POM 2917
May 30,	1917 I. Johnston	<i>T. gallica</i> L. ³	South of Ontario, Calif.	Large shrub, damp ground along road	POM 2918
<u>TAMARIX PENTANDRA PALLAS</u>					
	1875 Vasey	<i>Tamariscus</i>	Ag. Grounds ¹	--	US 10896
	1875 Vasey	<i>Tamariscus</i>	Ag. Grounds ¹	--	US 10926
	1875 Vasey	<i>Tamarix</i>	Ag. Grounds ¹	--	US 10929
	1880 Vasey	<i>T. gallica</i>	Ag. Grounds ¹	Cult.	US 10897
July 7,	1883 W. P. Conant	<i>Tamarix</i>	Agri. Grounds, D. C.	--	US 10927
	1885 A. L. Schott	<i>T. indica</i>	Dist. of Columbia	--	US 226862
June 10,	1893 J. J. Thornber	<i>T. gallica</i>	Brookings, S. Dakota	Col. Grounds	ARIZ 75069
May	1897 Dr. Vinson	<i>T. gallica</i>	Columbus, Ohio	--	ARIZ 75067
Aug 17,	1897 Biltmore Herbarium 4730	<i>T. gallica</i>	Biltmore, North Carolina	In cultivation	US 331806
Aug 18,	1901 T. H. Kearney	<i>T. gallica</i> ⁴	Tempe, Ariz.	Common in river bottoms	US 410903
Apr 15,	1902 S. M. Tracy and F. S. Earle 55	<i>T. gallica</i> L.	Barstow, Texas	--	US 441788
July 6,	1909 Ivar Tidestrom 2402	<i>T. gallica</i>	Kanab, Utah	In cultivation Alt. 1480 meters	US 508105

Table 1. --(continued)

Date	Collector and number	Collector's identification	Locality	Notes	Herbarium number
July 12, 1909	E. W. Nelson 4	<i>T. gallica</i>	Winslow, Ariz.	Introduced	US 564498
May 21, 1911	Geo. L. Fisher 116	<i>T. gallica</i>	Nara Visa, N. Mex.	Cultivated	US 660074
May 23, 1910	J. J. Thornber	<i>T. hispida</i> var. <i>aestivales</i>	Campus, Univ. of Ariz. Tucson	--	ARIZ 75074
April 9, 1913	J. J. Thornber	<i>T. juniperina</i>	Plant introduction Garden 10012 and 10043, Campus, Univ. of Ariz.	A handsome erect tree or shrub with flowers in lateral racemes	ARIZ 75077 ARIZ 75078
April 1913	J. J. Thornber 8135	<i>T. odesseyana</i>	Plant intro. Garden, Univ. of Ariz. Tucson	--	ARIZ 75080
May 22, 1913	J. J. Thornber 7370	<i>T. hispida</i> <i>aestivales</i>	Plant Intro. Garden, Univ. of Ariz.	--	ARIZ 75073
May 22, 1913	J. J. Thornber	<i>T. hispida</i> var.	Plant Introduction Garden, Campus, Univ. of Arizona	One of our most handsome shrubs with rose-red flowers and silvery foliage	ARIZ 75076
May 22, 1913	J. J. Thornber	<i>T. odesseyana</i>	Plant intro. Garden, Univ. of Ariz. Tucson	Flowers light pink or nearly white	ARIZ 75079
Sep 12, 1913	S. B. Parish 8612	<i>T. africana</i>	Borders of Salton Sea at Travertine	A single shrub	ARIZ 75056
Oct 13, 1913	J. N. Rose & Wm. R. Fitch 17899	<i>T. gallica</i> L.	Vicinity of Pecos City, Texas	--	US 760963
May 1916	J. J. Thornber 9152	<i>T. hispida</i> v. <i>aestivales</i>	Plant Introduction Garden, Campus, Univ. of Ariz.	--	ARIZ 75075
Apr 5, 1920	P. A. Munz & R. D. Harwood 3558	<i>T. pallasii</i>	Salton Sea, Calif.	Alkali sand. Alt. -150 ft.	POM 8215
<u>TAMARIX GALLICA L.</u>					
Apr 1877	J. F. Joor	<i>T. gallica</i> L.	Galveston I., Texas	On the beach. Completely naturalized. Collected again July 1884	US 724423
Sep 16, 1877	Lester F. Ward	<i>T. gallica</i>	Galveston, Texas	--	US 132460
Sep 1885	A. L. Schott	<i>T. germanica</i>	Agr. Dept. Pk., D. C.	--	US 132448
May 1894	Dr. H. Hapeman	<i>T. gallica</i>	Galveston, Texas	--	ARIZ 75065 US 504285
Apr 9, 1894	A. Arthur Heller 1528	<i>T. gallica</i>	Corpus Christi, Neueces Co., Texas	--	US 213939 ARIZ 75070 ARIZ 75077
Apr 17, 1896	A. A. & E. Gertrude Heller 2925	<i>T. gallica</i>	Near the Cliff House, San Francisco, Calif.	--	US 277759
Sep 22, 1901	S. M. Tracy 7525	<i>T. gallica</i>	Galveston Id., Tex.	--	US 442182
Sep 8, 1912	Geo. L. Fisher	<i>T. gallica</i>	Galveston, Texas	Tree 20 ft. high	US 503210
Apr 17, 1913	J. J. Thornber	<i>T. gallica</i>	Botanical Plant Intro. Garden, Univ. of Ariz. Tucson, Ariz.	--	ARIZ 75061
May 1913	Alice Tamson ⁵	<i>T. gallica</i>	Tucson, Ariz.	--	ARIZ 75062
May 21, 1913	J. J. Thornber	<i>T. gallica</i>	Plant Intro. Garden,	A large shrub with diffuse spreading branches. Scarcely a desirable plant.	ARIZ 75060

¹ Herbarium abbreviations: US = National Herbarium; POM = Pomona College Herbarium; ARIZ = University of Arizona.² U. S. Department of Agriculture, Washington, D. C.³ No flowers; foliage resembles *T. tetrandra*.⁴ No flowers; foliage resembles *T. pentandra*.⁵ Name illegible.

T. gallica has a definite angled disk with the filaments inserted on the points of the disk. Petals are deciduous and the anthers usually mucronate. The racemes are usually borne on open, scarcely branched panicles. The inflorescences are not particularly showy.

The earliest specimen of T. tetrandra was collected in 1871 from the U. S. Department of Agriculture Arboretum in Washington, D. C. The many specimens collected before 1900 show that this species was widely spread in the United States as an ornamental shrub; it often may have been the French tamarisk offered in the catalogs in the 1820's and 1830's.

T. pentandra was not mentioned in the United States in early references, but many early specimens can be identified as this species. This species, widely cultivated and often praised as a handsome shrub, may have been one of those introduced by nurserymen in the first half of the 19th century; perhaps, the one so persistently labeled: "Much admired".

The first United States collection of T. gallica was made in Texas where it was naturalized on Galveston Island in 1877. The species was not collected from the Department of Agriculture grounds until 1885. Inasmuch as the shrub is not nearly so attractive as the other two species -- flowers are scattered and relatively inconspicuous -- it is doubtful if this species was one of the two introduced and highly praised by the early nurserymen.

Only three specimens of deciduous tamarisk examined could not be readily identified as one of these three species. Two were similar to T. tetrandra, except that each anther was tipped with a very long, dark-red mucro about as long as the anther: C. S. Crandall 1153, June 11, 1889, Lawn, Lansing Mich. (CS 14083), and unknown collector in 1890, Agricultural College, Mich. (POM 135659). These are perhaps from the same shrub.

Another specimen, J. J. Thornber 8087, April 1915, campus of University of Arizona, Tucson (ARIZ 75059), was labeled T. gallica. Miss Elizabeth McClintock,⁵ in her study of

tamarisk taxonomy, identified it as T. africana Poiret. This identification is logical because the specimen has characters similar to the descriptions of that species: short spring racemes only about 1 inch long, large flowers, and capsules twice the size of the average T. pentandra.

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